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EXAMINER

ONUAKU, CHRISTOPHER O

ART UNIT	PAPER NUMBER
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2616

DATE MAILED: 04/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/336,530

Applicant(s)

YEO, BOON-LOCK

Examiner

Christopher O. Onuaku

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 10/5/04 have been fully considered but they are not persuasive.

Applicant argues, with reference to claim 1, that Toebe does not disclose or suggest determining whether a reference frame "is already in a decoded frame cache and making a decision based on that determination whether or not to decode a frame".

In response, examiner hereby points out that the limitation as recited above by the applicant in the applicant's argument is not precisely cited in claim 1. The pertinent portion of the claim 1 limitation cites "determining based at least in part on the list of frame dependencies whether a decoded version of the particular frame is in a decoded frame cache, said cache configured to store an arbitrary number of previously decoded frames, and if it is not and if the particular frame has a frame dependency". This limitation is clearly disclosed by Toebe in Fig.8; col.13, lines 38 to col.15, line 23, wherein Toebe clearly shows the processes involved in decoding an I-frame, a P-frame and a B-frame. In this process, the identity of the target frame is determined. Once the identity of the target frame is determined, the location in the video bitstream of the reference frames is determined, and the frame dependencies of the target frame are determined. The frame dependencies of the target frame must be parsed correctly and resident in the appropriate buffers for the target frame to be parsed (decoded). And in

Art Unit: 2616

col.4, lines 21-45, Toebees clearly discloses the process of parsing frame dependencies of target frames, and placing them in the proper buffers for use in decoding B and P frames, for example, when any of these frames appears for decoding.

Since the applicant's arguments with reference to the other independent claims are similar to the applicant's arguments with reference to independent claim 1, examiner's response to the applicant's arguments with reference to claim 1, therefore, applies to the other claims.

The rejections are, therefore, maintained.

Claim Rejections - 35 U.S.C. § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

3. Claims 1-8,10-13,15-21&23-38 are rejected under 35 U.S.C. 102(e) as being anticipated by Toebees, VIII et al (US 5,959,690).

Regarding claim 1, Toebees, VIII et al disclose a system and techniques for altering and decompressing digital motion video signals in a manner which allows efficient reverse play of the motion video as well as efficient frame-level access and play

Art Unit: 2616

of the motion video stream for creation of other special video effects, comprising the method of:

a) determining a request to randomly access (see col.7, lines 34-48 and col.15, lines 24-50) a particular frame,

b) maintaining a list of frame dependencies identifying at least a set of frames required to decode the particular frame (see col.14, lines 29-45),

c) determining based at least in part on the list of frame dependencies whether a decoded version of the particular frame is in a decoded frame cache (buffer), the cache configured to store an arbitrary number of previously decoded frames, and if it is not and if the particular frame has a frame dependency: i) determining a frame dependency for the particular frame, ii) determining which of the frames in the frame dependency are in the decoded frame cache, iii) decoding any frame in the frame dependency that is not in the decoded frame cache and placing it in the decoded frame cache, and iv) using at least some of the decoded frames in the frame dependency to decode the particular frame to create a decoded version of the particular frame (see Fig.3,4a,4b&8; col.14, lines 29-45; col.15, line 24 to col.16, line 37; col.4, lines 21-45; col.5, lines 50-67; col.9, line 49 to col.10, line 3; col.10, lines 48-58; col.12, lines 42-64).

Regarding claim 2, Toebees discloses the method of wherein the request to playback a particular frame is part of a request to perform frame-by-frame backward playback and part (c) is performed for successively earlier frames with respect to the

Art Unit: 2616

particular frame as part of the frame-by-frame backward playback (see Fig.9, col.17, line 35 to col.18, line 19).

Regarding claim 3, Toebes discloses the method wherein part (I) is performed whether or not it is determined that a decoded version of a particular frame is in the decoded frame cache without part (iv) being performed (see col.12, line 42-63).

Regarding claim 4, Toebes discloses the method wherein the particular frame may be an I, P, or B frame of the MPEG compressed video (col.12, line 42-63).

Regarding claim 5, Toebes discloses the method wherein the frame dependency is an immediate frame dependency (see col.12, lines 27-63).

Regarding claim 6, Toebes discloses the method wherein the at least some of the decoded frames referred to in part (iv) are those frames in the immediate dependency (see col.12, lines 27-63 and col.15, lines 24-50).

Regarding claim 7, Toebes discloses the method wherein part (c) includes recursion where frames in the immediate frame dependency of the frame of interest are not in the decoded frame cache (see col.8, line 24 to col.16, line 27; also see col.12, lines 51-63 and col.10, line 59 to col.11, line 9), here the recursion where frames in the immediate frame dependency of the frame of interest are not in the decoded frame

Art Unit: 2616

cache is not explicitly stated in the algorithm of Fig.8, but it is inherent in the process of trying to determine if all of the frames from which a target frame depends are parsed and added to the appropriate buffer in order to successfully complete the decoding process of the target frame, as disclosed in col.12, lines 51-63 and col.10, line 59 to col.11, line 9.

Regarding claim 8, Toebe discloses the method wherein part (c) includes a loop with a terminating condition that all frames on which the particular frame is dependent have been decoded (see Fig.8, and col.15, line 24 to col.16, 27).

Regarding claim 10, Toebe discloses the method wherein an index is used to represent each frame in the frame dependency (see Fig.3, and col.9, line 65 to col.10, line 39).

Regarding claim 11, Toebe discloses the method wherein the frame dependency is determined through a look-up table (see Fig.4b, and col.10, line 62 to col.11, line 9), examiner reads Fig.4a as frame dependency look-up table since Fig.4b shows the frames from which the frame dependency of a frame can be determined..

Regarding claim 12, Toebe discloses the method wherein the frame dependency is determined through successive uses of a look-up table (see Fig.4b, and

Art Unit: 2616

col.10, line 62 to col.11, line 9), as shown in claim 11, the look-up table of Fig.4b is used in the determination of the frame dependency of I- or P- or B-frame.

Regarding claim 13, Toebees discloses the method wherein the decoded frame cache includes a data structure (see 'past' and 'future' buffers as the decoded frame cache (buffer); col.4, lines 21-45; col.10, lines 48-58; col.11, lines 4-9, col.12, lines 35-63; and col.15, line 66 to col.16, line 7).

Regarding claim 15, the claimed limitations of claim 15 are accommodated in the discussions of claim 1, except a computer readable medium (see col.8, lines 35-48).

Regarding claim 16, the claimed limitations of claim 16 are accommodated in the discussions of claim 2.

Regarding claim 17, the claimed limitations of claim 17 are accommodated in the discussions of claim 3.

Regarding claim 18, the claimed limitations of claim 18 are accommodated in the discussions of claim 5.

Regarding claim 19, the claimed limitations of claim 19 are accommodated in the discussions of claim 6.

Art Unit: 2616

Regarding claim 20, the claimed limitations of claim 20 are accommodated in the discussions of claim 7.

Regarding claim 21, the claimed limitations of claim 21 are accommodated in the discussions of claim 8.

Regarding claim 23, the claimed limitations of claim 23 are accommodated in the discussions of claim 10.

Regarding claim 24, the claimed limitations of claim 24 are accommodated in the discussions of claim 11.

Regarding claim 25, the claimed limitations of claim 25 are accommodated in the discussions of claim 12.

Regarding claim 26, the claimed limitations of claim 26 are accommodated in the discussions of claim 15, including processor (see Fig.2 and at least de-multiplexer 15, MPEG streamer 23 and MPEG player 37), a display (see display 35), and memory including instructions (see Fig.2 and MPEG player 37 and col.11, lines 20-38 and col.15, lines 24-50).

Regarding claim 27, Toebes, VIII et al disclose a system and techniques for altering and decompressing digital motion video signals in a manner which allows efficient reverse play of the motion video as well as efficient frame-level access and play of the motion video stream for creation of other special video effects, comprising the method of: maintaining a list of frame dependencies identifying at least a set of frames required to decode the first frame (see col.14, lines 29-45), determining a decoding of the first frame is not in a decoded frame cache, determining, based at least in part on the list of frame dependencies, a first frame dependency for the first frame comprising frames required to decode the first frame, decoding at least one of the frames of the frame dependency not present in the decoded frame cache, and placing it in the decoded frame cache, and decoding the first frame using at least one of the decoded frames in the decoded frame cache (see Fig.4a&4b; col.13, line 38 to col.14, line 2; and col.6, lines 21-67, and col.10, line 59 to col.11, line 38), here the B frame reads on the claimed "first frame", and "past" and "future" buffers read on the claimed decoded frame cache, ..

Regarding claim 28, Toebes, VIII et al disclose the method comprising decoding each frame of the frame dependency not present in the decoded frame cache and placing them in the decoded frame cache (see col.13, 47-51; also see claim 27 discussions).

Art Unit: 2616

Regarding claim 29, the claimed limitations of claim 28 are accommodated in the discussions of claim 7 above.

Regarding claim 30, Toebes, VIII et al disclose the method of reverse playback comprising determining a second frame is not in the decoded frame cache, the second frame following the first frame in the video stream, determining a second frame dependency for the second frame comprising frames required to decode the second frame, decoding at least one of the frames of the frame dependency not present in the decoded frame cache, and placing them in the decoded frame cache, and decoding the second frame using at least one of the decoded frames in the decoded frame cache (see col.17, line 35 to col.18, line 25), here the P frame reads on the claimed "second frame".

Regarding claim 31, Toebes, VIII et al disclose the method comprising playing the second frame and then the first frame (see claim 27 and claim 30 discussions wherein Toebes, VIII et al disclose the methods of playing a first frame in normal play and playing the second frame in reverse playing, and therefore, the claimed limitations of claim 31 are accommodated in the discussions of claims 27 and claim 30 above).

Regarding claim 32, the claimed limitations of claim 32 are accommodated in the discussions of claims 27 and claim 30 above, since B frame of claim 27 immediately follow the P frame of claim 30.

Regarding claim 33, the claimed limitations of claim 33 are accommodated in the discussions of claim 15 and claim 27 above, including wherein the cache is configured to store an arbitrary number of previously decoded frames (see (see Fig.3,4a,4b&8; col.14, lines 29-45; col.15, line 24 to col.16, line 37; col.4, lines 21-45; col.5, lines 50-67; col.9, line 49 to col.10, line 3; col.10, lines 48-58; col.12, lines 42-64).

Regarding claim 34, the claimed limitations of claim 34 are accommodated in the discussions of claims 28&33 above.

Regarding claim 35, the claimed limitations of claim 35 are accommodated in the discussions of claims 7,27& 33 above.

Regarding claim 36, the claimed limitations of claim 36 are accommodated in the discussions of claims 30&33 above.

Regarding claim 37, the claimed limitations of claim 37 are accommodated in the discussions of claim 1 above.

Regarding claim 38, the claimed limitations of claim 38 are accommodated in the discussions of claims 1&2 above.

Claim Rejections - 35 U.S.C. § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 9&22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toebe, VIII et al in view of Proctor et al (US 6,072,830).

Regarding claim 9, Toebe, VIII et al fail to disclose wherein decoded frames are replaced in the decoded frame cache according to a least recently used policy. Proctor et al teach method and apparatus of encoding and decoding digitized video signals comprising Fig.4 and cache update mechanism 42 and cache memory 36, wherein one of the following cache stack replacement algorithms is utilized: the least-recently-used (LRU) algorithm, the least-frequently-used (LFU) algorithm, the first-in-first-out (FIFO) algorithm. In the least-recently-used algorithm, the motion vector to be replaced is the one whose last reference is the oldest, or has the largest backward distance (see col.11, line 51 to col.12, line 11).

It would have been obvious to modify Toebe by realizing Toebe with the means to apply the least-recently-used algorithm, as taught by Proctor, in the manipulation of the contents of a cache, e.g., the future buffer, wherein decoded frames are stored for processing, in order, for example, to replace the decoded frame whose

Art Unit: 2616

last reference is the oldest, thereby creating more space in the future buffer to store more recently decoded frames for future processing.

Regarding claim 22, the claimed limitations of claim 22 are accommodated in the discussions of claim 9.

6. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toebes, VIII et al.

Regarding claim 14, Toebes fails to explicitly disclose the method wherein the decoded frame cache includes a section of main memory. Official Notice is taken that it is well known to include in one memory means different sections that store different types of data, each data section serving a specific function. It would, therefore, have been obvious to modify Toebes by realizing Toebes with a memory system (main memory) containing different sections and each section storing different type of data (e.g., decoded frame), thereby providing the desirable advantage of making the Toebes memory system a more compact system.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

Art Unit: 2616

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

8. Any inquiry concerning this communication or earlier communications from this examiner should be directed to Christopher Onuaku whose telephone number is (571) 272-7375. The examiner can normally be reached on Tuesday to Thursday from 7:30 am to 5:00 pm. The examiner can also be reached on alternate Monday.

If attempts to reach the examiner by telephone is unsuccessful, the examiner's supervisor, Andrew Faile, can be reached on (571) 272-7375.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314, (for formal communications intended for entry)

and (for informal or draft communications, please label "PROPOSED" or "DRAFT")


Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Art Unit: 2616

Any inquiry of a general nature or relating to the status of this application should be directed to Customer Service whose telephone number is (703) 306-0377.


COO

3/25/05


ANDREW FAILE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600